

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property
Organization
International Bureau



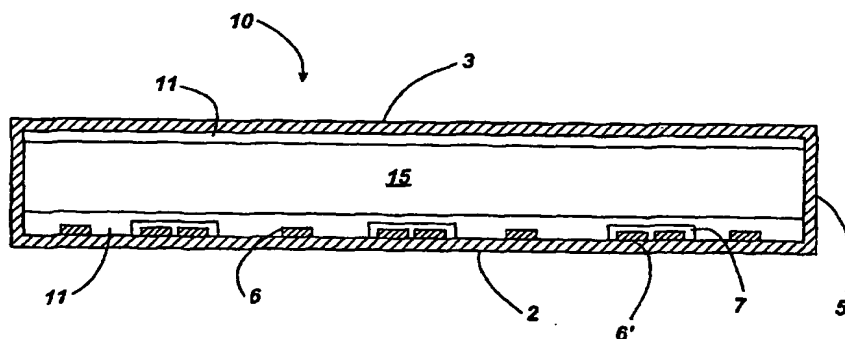
(43) International Publication Date
2 December 2004 (02.12.2004)

PCT

(10) International Publication Number
WO 2004/105070 A3

- (51) International Patent Classification⁷: **H01J 1/62**, 63/04, C09K 11/64
- (21) International Application Number: PCT/US2004/015079
- (22) International Filing Date: 13 May 2004 (13.05.2004)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
60/470,635 15 May 2003 (15.05.2003) US
60/470,734 15 May 2003 (15.05.2003) US
- (71) Applicant (for all designated States except US): **OSRAM SYLVANIA INC.** [US/US]; 100 Endicott Street, Danvers, MA 01923 (US).
- (72) Inventors; and
- (75) Inventors/Applicants (for US only): **MARKING, Gregory** [US/US]; 210 So. Pennsylvania Avenue, Sayre, PA 18840 (US). **CHAU, Chung-Nin** [US/US]; 111 Walnut Street, Apt. #3, Athens, PA 18810 (US). **SNYDER, Thomas** [US/US]; R.R. Box 1472, Laceyville, PA 18623 (US). **NORTHROP, Shellie, K.** [US/US]; Larch Road, Apt. 4, Sayre, PA 18840 (US). **FAN, Chen-Wen** [US/US]; 214 Sharon Avenue, Sayre, PA 18840 (US).
- (74) Agent: **CASTEL, Benoît**; c/o Young & Thompson, 745 South 23rd Street, Arlington, VA 22202 (US).
- (81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.
- (84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).
- Published:
— with international search report
- (88) Date of publication of the international search report:
23 June 2005
- For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: VUV-EXCITED DEVICE WITH BLUE-EMITTING PHOSPHOR



(57) Abstract: Blue-emitting phosphors for use with plasma display panels (PDP) or other vacuum ultraviolet-excited (VUV) devices are provided. These blue-emitting phosphors and mixtures thereof include at least a europium-activated calcium-substituted barium hexa-aluminate (CBAL) phosphor. Preferably, the CBAL phosphor has a composition which may be represented by the formula: $\text{Ba}_{1.29-x-y}\text{Ca}_x\text{Eu}_y\text{Al}_{12}\text{O}_{19.29}$, wherein $0 < x < 0.25$ and $0.01 < y < 0.20$.

These blue-emitting phosphors exhibit improved degradation characteristics, including reduced color shift and increased intensity maintenance, under conditions found in VUV-excited devices.

WO 2004/105070 A3

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US04/15079

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : H01J 1/62, 63/04; C09K 11/64

US CL : 313/486; 252/301.4r

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 313/486,487,489; 252/301.4r

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 3,670,194 A (Thornton et al) 13 June 1972 (13.06.1972).	1-20
A	US 4,733,126 A (Yamakawa et al) 22 March 1988 (22.03.88).	1-20
A	US 4,827,187 A (Verlijdonk) 2 May 1989 (02.05.1989).	1-20
A	US 5,471,113 (De Backer et al) 28, November 1995 (28.11.1995).	1-20
A	US 2002/0025901 A1 (Ono et al) 28 February 2002 (28.02.2002).	1-20

☐ Further documents are listed in the continuation of Box C.☐ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T"

later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X"

document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y"

document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&"

document member of the same patent family

Date of the actual completion of the international search

01 February 2005 (01.02.2005)

Date of mailing of the international search report

31 MAR 2005

Name and mailing address of the ISA/US

Mail Stop PCT, Attn: ISA/US

Commissioner for Patents

P.O. Box 1450

Alexandria, Virginia 22313-1450

Facsimile No. (703) 305-3230

Authorized officer

Peter J Macchiarolo

Telephone No. (571) 272-1500

JOSEPH WILLIAMS
PRIMARY EXAMINER